

Maryland Smart Energy Communities

Electricity Reduction Planning

September 10, 2013 Webinar

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Agenda

- Overview of the Electricity Reduction Plan (ERP)
- Step-by-step process for constructing an ERP
- Sample scenarios and simple analysis
- Summary of the ERP process and important notes

ERP – Five Components*

- 1 – Letters of approval for ERP from Council
- 2 – Executive Summary of baseline, goal, and plans
- 3 – Narrative describing energy baseline
- 4 – Narrative describing goal, existing energy efficiency projects and plans to expand over coming decade
- 5 – References

In most cases, this is already complete.

Area of focus.

* These five components are guidelines for how to design and package the ERP. We are very flexible on this point…

Part 4 – Outline

- IV. ELECTRICITY REDUCTION PLAN
  - Narrative Summary
    - 1. Overview of Goals for Years 1-3
    - 2. Overview of Goals for Years 4-5
    - 3. Identify Areas of Least Efficiency/Greatest Waste
  - Getting to a 15% Electricity Use Reduction Within the 5 Year Period Following the Baseline Year
    - Program Management Plan for Implementation, Monitoring and Oversight
    - Summary of Energy Audit(s) or Other Sources for Projected Energy Savings
  - Summary of Long-Term Energy Reduction Goals –Beyond 5 years

Baseline: Precursor to a ERP

- **Establish energy efficiency baseline**
  - Measured as a **normalized** value *(e.g., kWh/gross square foot)* ***NOT*** as total kilowatt-hours or megawatt-hours of *consumed* electricity
    - E.g. Baseline for energy efficiency goal = 0.*012 MWH/gross square foot* ***NOT*** 8,280 MWh
  - Baseline value = **consumed electricity*** / total building square footage

* Note: Goal is based on total **consumed** electricity. Although communities may purchase less electricity as they install renewable generating capacity, the efficiency goal is still measured based on consumption. Consumption = purchased + generated electricity.

Part 4 – Constructing the ERP

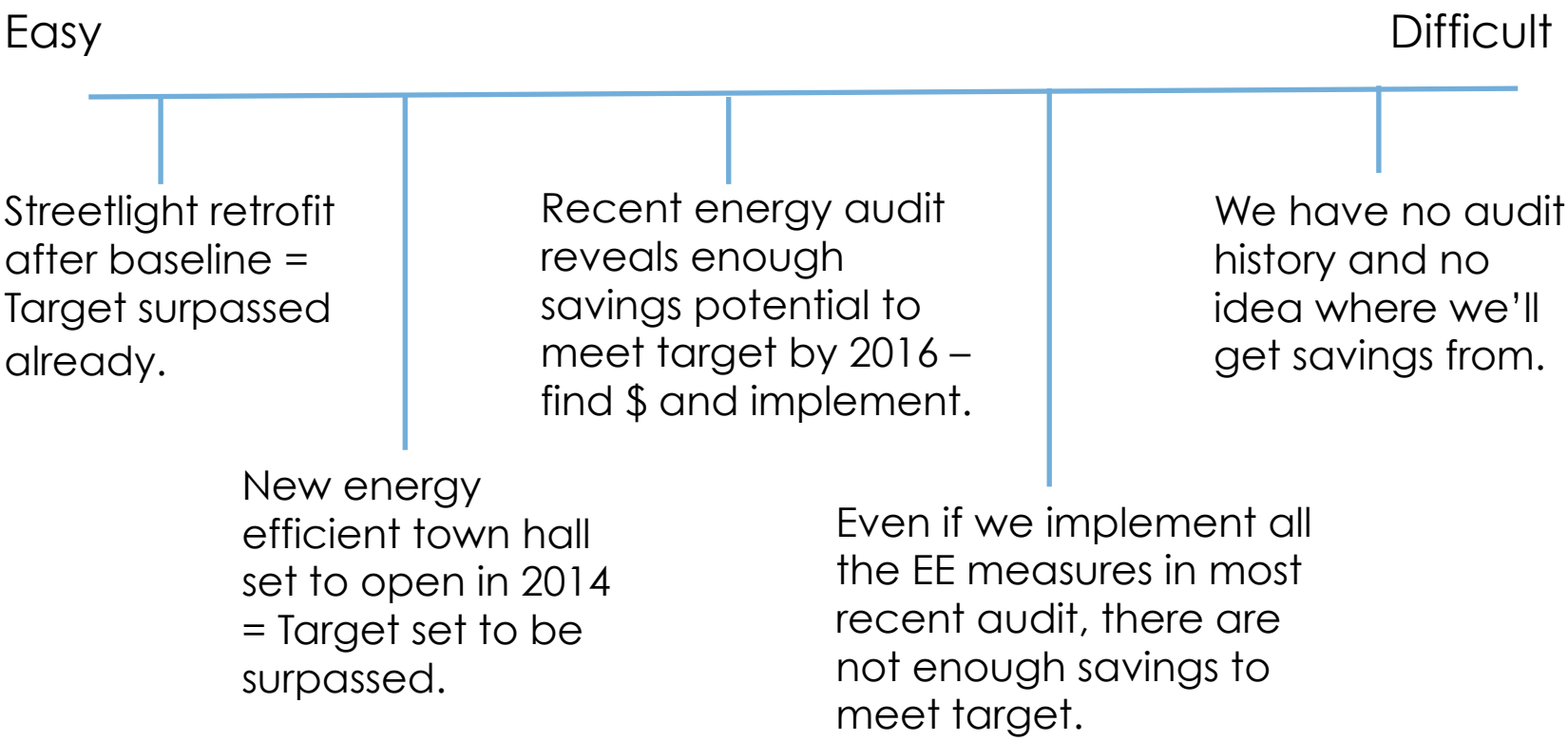
- Step 1: Determine the amount of electricity reduction needed
  - Assume the square footage of your building space won't change*
    - = (0.15) x baseline electricity consumption
    - E.g., = (0.15) x 8,280 MWh = 1,242 MWh within 5 years of baseline
- Step 2: For communities that selected earlier baselines to capture recent energy efficiency measures, adjust the reduction goal accordingly**
  - [(0.15) x baseline electricity consumption] – [(baseline consumption - existing consumption)] = True estimate of needed electricity savings
    - E.g., Community has baseline year of 2010 and consumed 8,280 MWh. If 2012 electricity shows only 8,000 MWh were consumed, then 280 MWh can be shaved off the goal and only 962 MWh of savings are needed.

* For simplicity of developing the ERP and projection of next 5 years, this assumption is fine. However, in most cases new buildings will be more efficient than existing buildings making for an important contribution to the reduction.

** If communities want to take credit for recent energy savings, they should be prepared to show data and changes in building space.

Identifying Efficiency Projects

The Sliding Scale of Community Energy Efficiency Planning



Sample 1 – (Highland Beach)

Total Electricity in 2011 (MWh)	29.0
Gross Square Feet	3,827
Baseline 2010 (MWh/sqft)	0.0075
15 % Reduction (MWh/sqft per year)	0.0011
15 % Reduction (MWh – assuming building sqft constant)	4.35*
Total Electricity 2012 (MWh)	19.5
Total Electricity Reduction (MWh/sqft)	0.0025
0.0025 > 0.0011 needed, so goal is achieved	
Remaining Reductions (MWh)	None – Goal Met

* Where can we find 4.35 MWh worth of electricity savings?

Sample 2 – (University Park)

Total Electricity in 2011 (MWh)	32.8
Gross Square Feet	3,350
Baseline 2011 (MWh/sqft)	0.0097
15 % (MWh/sqft per year)	0.0015
15 % (MWh – assuming building sqft constant)	4.92
Anticipated Reductions (see 2012 Energy Audit)	4.55
Remaining Reductions TBD (MWh)	.37

Interpreting Energy Audits

Summary of Audit Results Sample			
End Use Category	**Cost Savings**	**Electricity kWh**	**NG Therms**
Space Heating Savings	$676		563
Air Conditioning Savings	$334	2,288	
Water Heating Savings	$3		2
Electric Baseload Savings	$330	2,263	
Total Projected Savings	$1,343	4,551	556
Total Percent Savings	20.4	13.9	37.5

Sample 3 – (Harford County)

Total Electricity in 2012 (MWh)	31,137
Gross Square Feet	1.05 Million
Baseline 2012 (MWh/sqft per year)	0.0296
15 % (MWh/sqft)	0.0044
15 % (MWh – assuming building sqft constant)	4,671
Planned and Executed 2013 Projects – Expected Electricity Savings (MWh)	1,090
Remaining Reductions (MWh)	3,581

Projects to meet this shortfall TBD based on budget availability, but potential projects include:

- *Installation of instantaneous water heaters in 5 bldgs.*
- *New heat pumps to be installed at 2 DPW buildings.*
- *Desktop cloud visualization installed at County buildings.*

Demonstrating Electricity Savings

- **Step 3:** Communities should provide quantitative data on achieved/expected electricity savings from the following sources, in roughly this order:
  - 1. Actual electricity savings achieved since baseline year;
  - 2. Efficiency projects completed in past year for which there may not be hard data yet, but there should be forecasted projections;
  - 3. Planned efficiency projects for the next year with MSEC funds;
  - 4. Recommended efficiency projects from an audit, but not yet implemented;
  - 5. Fuel switching away from electricity (e.g., solar hot water, gas heat);
  - 6. Expected electricity savings per GSF associated with change in bldg. space;
  - 7. Estimated electricity savings from upcoming repairs/replacements;
  - 8. **As a last resort**, after working with your MEA program manager and making honest attempt at finding projects, TBD is acceptable.

Is the Goal Achievable?

Step 4: Ensure the identified projects are sufficient to meet goal.

Project/ Type	Projected Annual Electricity Savings (kWh)			
Energy Efficient HVAC/ Server Replacement	111,670		**Gross Square Feet**	53,001
Optimal Start/ Stop	70,400		**Electricity Consumption Intensity (kWh/SqFt)**	18
Lighting Retrofit	4,914		**15 % (kWh/sqft per year)**	2.7
TOTAL	186,984		**15 % (kWh – assuming building sqft constant)**	143,103
			Total Electricity (kWh)	980,500

All projects total ~186,984 kWh of annual generation, which is greater than 15% of baseline = ~143,103 kWh

Consider Implementation

- **Step 5:** Planning for implementation
  - status/projected timeline
  - projected electricity savings (MWh)
  - projected cost savings
  - projected total cost
  - any utility incentives received
  - any planned use of Maryland Smart Energy Communities grant funds, if designated
  - for measures requiring additional funding, please list the funding source, i.e. capital budget, operating budget, other grants, etc.
  - the source of the calculated energy and cost savings in the reference column. Calculations must be included in appendix

Sample Analysis – see Table 2 of Guidelines

Project/ Type	Status	Projected Annual Electricity Savings (kWh)	Projected Annual Cost Savings ($)	Total Installed Cost ($)	Utility Incentives ($)	Net Cost ($)	Funding Source(s) for Net Costs	Source for Projected Savings
Energy Efficient HVAC/ Server Replace.	*complete 10/2011*	1,116,705	$122,838	$689,410	$0	$689,410	*Grant/ Capital*	Engineer Firm
Optimal Start/ Stop	*complete 7/2012*	70,400	$7,744	$1,926	$0	$1,926	*Grant*	Audit
Lighting Retrofit	*complete 11/2012*	4,914	$541	$1,707	$1,366	$341	*Capital*	BGE Smart Energy Savers Program

Other Additions to the ERP

- Program Management Plan for Implementation, Monitoring and Oversight.
  - Who's in charge? Who will continue to monitor reductions?
- Summary of Energy Audit(s) or Other Sources for Projected Energy Savings
  - Include all energy audit results in the appendix of the ERP
  - If creating an ERP without an audit – analyze the energy baseline data for the buildings which are least efficient.
    - Identify appropriate Energy Conservation Measures based upon knowledge of the building and its equipment.
    - If unsure of equipment specifics, request information from equipment manufacturers.
    - Contact MEA or EFC to help with some rough analysis.

Tools and Resources

- Outside of an audit, what is the best way to evaluate expected electricity savings associated with a project?
  - Northeast Energy Efficiency Partnership (NEEP) Technical Reference Manual:
    - Available online: http://www.neep.org/Assets/uploads/files/emv/emv-products/TRM_March2013Version.pdf
  - EPA Energy Star Website (for expected savings associated with appliance replacement)
    - Available online: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.
  - Contact MEA or EFC to help with some calculations.

Summary and Important Notes

- We are very flexible about how communities package and design their planning documents. This presentation and the guidance documents serve mostly as a template.
- We are looking for a few key components though:
  - Some thoughtful, quantitative analysis about how much electricity reduction is needed
  - Consideration of potential projects and estimated savings
  - Implementation pieces such as financing ideas and staff responsibilities
  - Approval from an executive strengthens the plan
- We recognize communities will not have all project details at this point and commitment to specific projects is difficult.
  - As a guiding principle, the more effort and collaboration put into the planning, the better the chances of meeting the goals. We want communities to meet the goals.
- Treat the action plan as a living document that will be updated when more information is available in future years, while making a good-faith effort now.